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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/603,393	06/23/2000	JASON F. MCCULLOUGH	062891.0347	1091

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EXAMINER

AHN, SAM K

ART UNIT

PAPER NUMBER

2634

DATE MAILED: 10/06/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No.	Applicant(s)
	09/603,393	MCCULLOUGH ET AL.
	Examiner	Art Unit
	Sam K Ahn	2634

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM  
THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1) Responsive to communication(s) filed on 23 June 2000.

2a) This action is FINAL.                    2b) This action is non-final.

3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4) Claim(s) 1-33 is/are pending in the application.

4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.

5) Claim(s) \_\_\_\_\_ is/are allowed.

6) Claim(s) 1-11, 17-19, 25-27 and 33 is/are rejected.

7) Claim(s) 12-16, 20-24 and 28-32 is/are objected to.

8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

9) The specification is objected to by the Examiner.

10) The drawing(s) filed on \_\_\_\_\_ is/are: a) accepted or b) objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11) The proposed drawing correction filed on \_\_\_\_\_ is: a) approved b) disapproved by the Examiner.

    If approved, corrected drawings are required in reply to this Office action.

12) The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

13) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a) All b) Some \* c) None of:

    1. Certified copies of the priority documents have been received.

    2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.

    3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

14) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

    a) The translation of the foreign language provisional application has been received.

15) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

1) Notice of References Cited (PTO-892)

2) Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_

4) Interview Summary (PTO-413) Paper No(s) \_\_\_\_\_

5) Notice of Informal Patent Application (PTO-152)

6) Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Claim Objections***

1. Claim 7 is objected to because of the following informalities: In lines 4-5, it is suggested to change “the complex impedance” to “the variable complex impedance”. Appropriate correction is required.
2. Claims 16 and 17 are objected to because of the following informalities: In lines 1-2, it is suggested to change “adjusting analog characteristics of the line driver” to “adjusting the analog characteristics of the line driver”.

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 1-9 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.
  - a. Claim 1 recites the limitation "the data" in line 6. There is insufficient antecedent basis for this limitation in the claim. In line 3, it recites “bits of data”. Is “the data” referring to the “bits of data”? It is unclear as to which data the line driver is providing power to.

b. Claims 4 and 5 recite the limitation "the xDSL communications protocol" in line 2.

There is insufficient antecedent basis for this limitation in the claim.

c. Claim 9 recites the limitation "the period of inactivity" in line 4. There is insufficient antecedent basis for this limitation in the claim.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1-3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kao ('515) in view of Mukherjee ('322).

Regarding claim 1, Kao's teaching of a digital subscriber line (xDSL) communications device comprises a digital engine (DMT Tx Core - 250 in Fig.2) assigning bits of data for transmission in an allocated bandwidth. ( note col.9, lines 39-45) Further, RAM (430) stores provisional parameters and trained parameters (note col.11, lines29-48) where the raw data or provisional parameters are initialized. (note col.11, line 55 – col.12, line 20) The controller (418 in Fig.4) performs energy and bit loading process where the available bandwidth is determined by going through the steps

of finding minimum and maximum bit capacities for each subchannel and calculating the total bit rate. (note col.12, line 21- col.13, line 45) When total power exceeds the power margin, one of the provisioned parameter, the total bit rate is reduced. (540 in Fig.5) When reducing bit rates, some of the subchannel may be disabled. (note col.13, lines 19-29) With the disabling of some subchannels, only a portion of the available bandwidth is assigned as the allocated bandwidth due to power margin. As a result, the power spectrum is adjusted to correspond with the allocated bandwidth, since some of the subchannels are disabled.

However, Kao does not explicitly disclose a line driver providing power across for transmitting bits of data. Although it is not mentioned by Kao, it is inherent that a line driver is comprised in Kao's system as it is a critical component needed to transmit data in any system.

Further, Mukherjee teaches dsl system, in the same field of endeavor, comprising a line driver coupled to a hybrid circuit (see 14 in Fig.1) where the line driver provides power on the line for transmission. Therefore, it would have been obvious to one skilled in the art at the time of invention to include a line driver, such as Mukherjee's teaching of 14 in Fig.1, coupled to a hybrid block (220 in Fig.2) for the purpose of effectively transmitting data across the dsl link to a distant receiver.

Regarding claim 2, Kao teaches all subject matter claimed, as applied to claim 1. Kao further teaches the DSL communications device connected to customer premises

equipment through a twisted pair line forming a local loop or a copper wire loop. ( note col.9, lines 16-28)

Regarding claim 3, Kao teaches all subject matter claimed, as applied to claim 1. The limitation of upstream and downstream frequency bandwidth, upstream and downstream margin parameters comprised in the trained parameters are inherent as these parameters are essential parameters in a dsl system. (and note col.11, lines 29-48) Kao further teaches the available bandwidth comprises the downstream frequency bandwidth, since the total bit rate is for the downstream.

5. Claims 8, 10, 11, 17-19, 25-27 and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kao ('515) in view of Mukherjee ('322) in further view of Agah ('187).

Regarding claims 10, 18 and 26, Kao in view of Mukherjee teach all subject matter claimed, as applied to claim 1. Kao teaches that the available bandwidth is determined based on the system parameters or the provisional parameters, and further, a portion of the available bandwidth is allocated. However, Kao in view of Mukherjee do not teach adjusting analog characteristics of the line driver to correspond with the allocated portion of the available bandwidth. Agah teaches, in the same field of endeavor, a dsl communication system comprising a line driver. The line driver changes its analog characteristic (see Table 1 in col.10) depending on the system parameters. (note col.10, lines 42-59) One of the reasons for adjusting the line driver characteristics is to reduce power consumption. Therefore, it would have been obvious to one skilled in

the art at the time of invention to adjust the analog characteristics of the line driver upon determination of necessity for power reduction. Table 2 further shows the amount of power saved by adjusting the characteristics of the line driver. Both Kao and Agah changes parameters of the system to reduce power consumption.

Regarding claims 11, 19 and 27, Kao teaches all subject matter claimed, as applied to claim 10, 18 or 26. The limitation of upstream and downstream frequency bandwidth, upstream and downstream margin parameters comprised in the trained parameters are inherent as these parameters are essential parameters in a dsl system. (and note col.11, lines 29-48) Kao further teaches the available bandwidth comprises the downstream frequency bandwidth, since the total bit rate is for the downstream.

Regarding claims 17, 25 and 33, Kao in view of Mukherjee in further view of Agah teach all subject matter claimed, as applied to claim 10, 18 or 26. Agah further teaches changing the power supply level. (see Table 2 in col.11)

Regarding claim 8, Kao in view of Mukherjee teaches all subject matter claimed, as applied to claim 1. However, Kao in view of Mukherjee do not teach adjusting analog characteristics of the line driver to correspond with the allocated portion of the available bandwidth. Agah teaches, in the same field of endeavor, a dsl communication system comprising a line driver. The line driver changes its analog characteristic (see Table 1 in col.10) depending on the system parameters. (note col.10, lines 42-59) One of the

reasons for adjusting the line driver characteristics is to reduce power consumption.

Therefore, it would have been obvious to one skilled in the art at the time of invention to adjust the analog characteristics of the line driver upon determination of necessity for power reduction. Table 2 further shows the amount of power saved by adjusting the characteristics of the line driver. Both Kao and Agah changes parameters of the system to reduce power consumption. Agah further teaches changing the power supply level. (see Table 2 in col.11)

***Allowable Subject Matter***

6. Claims 4-7, 9, 12-17, 20-24 and 28-32 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims, and overcome its respective 112 2<sup>nd</sup> paragraph rejection and claim objections.
7. The following is a statement of reasons for the indication of allowable subject matter:  
Present application discloses DSL communications device comprising a digital engine, a line driver, a memory, and a controller determining the available bandwidth and adjusting the effective power spectrum corresponding with the allocated bandwidth. Closest prior art, Kao teaches, in the same field of endeavor, a dsl communication device performing bit and energy configurations of subchannels in the transmission signal. However, Kao does not teach the further limitation of DMT protocol where the allocated bandwidth having a frequency range corresponding to a low frequency bin and having data throughput equal to or greater than the

provisioned parameters. Kao also does not teach support of CAP protocol with allocated bandwidth having a data throughput equal to or greater than the provisioned parameters. Present application also discloses, which is not taught by prior art, adjusting effective power spectrum by reducing frequency cutoff of the line driver. Moreover, the detailed configuration of the line driver of adjusting its analog characteristics are not taught by prior art.

***Conclusion***

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Laroia et al., Bremer et al. And Hyll are cited as having related subject matter in regards to DSL communication system with bit loading techniques.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to **Sam Ahn** whose telephone number is **(703) 305-0754**.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, **Stephen Chin**, can be reached at **(703) 305-4714**.

**Any response to this action should be mailed to:**

Commissioner of Patents and Trademarks

P.O. Box 1450

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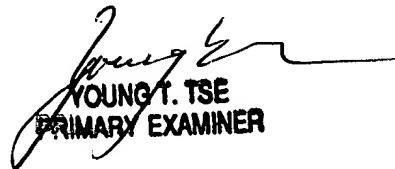
**or faxed to:**

**(703) 872-9306**

Hand-delivered responses should be brought to Crystal Park II, 2121 Crystal Drive, Arlington, VA., Sixth Floor (Receptionist).

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Technology Center 2600 Customer Service Office whose telephone number is (703) 306-0377.

Sam K. Ahn  
9/30/03



YOUNG T. TSE  
PRIMARY EXAMINER